Apple® SCSI Hard Disk

Update

IMPORTANT: Read the preface to this Update before reading the accompanying manuals.

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Preface

How to Use This Update

This update, which accompanies the Apple® Hard Disk 20SC, the Apple Hard Disk 40SC, and the Apple Hard Disk 80SC, adds and changes information in both the *Hard Disk 20SC Owner's Guide* and the *Apple SCSI Cable System* manual, both of which you should also have.

Together, these three guides explain how to connect, prepare, and use any external hard disk in the SC series with any Macintosh™ or Apple II computer with a Small Computer System Interface (SCSI, pronounced SCUH-zee) port.

- Chapter 1 provides new information on how to prepare and use your Hard Disk SC with your Macintosh.
- Chapter 2 explains how to use HD Backup to copy the contents of your hard disk onto 3.5-inch disks, and how to restore, if necessary, the contents of your hard disk. HD Backup is included on the *Hard Disk SC Installation* disk.
- Chapter 3 provides new information on how to prepare and use your Hard Disk SC with your Apple II.
- Chapter 4 provides new information on how to use the Apple SCSI Cable System to connect your hard disk or other SCSI devices to your computer.

Chapter 1

Your Hard Disk and Your Macintosh

There are presently three devices in the Hard Disk SC series: the Hard Disk 20SC, the Hard Disk 40SC, and the Hard Disk 80SC. These three devices provide 20, 40, and 80 megabytes of storage, respectively. (20 megabytes is roughly equivalent to ten thousand pages of information.) Except for their labels, the devices are virtually identical on the outside.

With your Macintosh, you connect, prepare, and use all three hard disks exactly the same way.

The Hard Disk 40SC and Hard Disk 80 SC not only store more information than the Hard Disk 20SC, but they exchange information with your computer at a much faster rate. (See the Appendix, "Specifications.")

Most of the changes described here result from the introduction, since the publication of the *Hard Disk 20SC Owner's Guide,* of new versions of the both the Macintosh and its system files.

Switching off your hard disk

Your *Hard Disk SC Installation* disk contains a new version of the Finder that makes it easier to shut down your system without risking damage to the contents of your hard disk. Be sure, therefore, to install a current version of the Finder.

The new Special menu contains both a Restart and a Shut Down command. Restart does exactly what the old version of Shut Down did: It ejects all 3.5-inch disks and restarts your machine. The new Shut Down command ejects the 3.5-inch disks and darkens most of the screen. A dialog box tells you that you can safely switch off the power, and there is a Restart button that you can click if you wish to restart.

To switch off your hard disk using the new Shut Down command, follow these steps:

1. **Quit the application you're working in and return to the desktop.**

   If your hard disk is not the current startup disk, you can switch it off.

2. **Choose Shut Down from the Special menu.**

This ejects all 3.5-inch disks, empties the trash, records all Finder operations, and *turns off* your Macintosh.

3. **When Shut Down is completed, switch off your startup hard disk.**
4. **Turn off the power switch on your Macintosh.**

Warning Never switch off the Hard Disk SC while the light is blinking. You may lose information on the hard disk.

Redesignating the startup device on your Macintosh SE or Macintosh II

When you start up your Macintosh, the computer automatically looks for the necessary startup files in the order shown in "Switching on a Macintosh," in Chapter 1 of your *Hard Disk 20SC Owner's Guide*. Thus, the priority numbers that you assign your SCSI hard disks may determine which device is the startup device.

If you have a Macintosh SE or Macintosh II, you can use the Control Panel to override the scanning sequence during startup, by following these steps:

1. **Choose Control Panel from the Apple menu.**
2. **Click the Startup Device icon.**

   Use the scroll bar if necessary to bring the Startup Device icon into view.

3. **Click the icon that represents the hard disk you want to use to start up.**

   When you start up your computer, the system uses that hard disk as the startup disk, unless there is a 3.5-inch disk inserted or a non-SCSI hard disk connected.

   If you no longer want to designate the hard disk as your startup device, hold down the Apple key and click its icon.

4. **Close the Control Panel.**

Using your Hard Disk SC and an internal SCSI hard disk

On the Macintosh SE and Macintosh II, you can have a SCSI hard disk mounted inside your computer. You can connect one or more external Hard Disk SC's to your Macintosh, as well, but you're still limited to a total of seven SCSI devices, including the internal hard disk. For more information on your internal SCSI hard disk, see your Macintosh owner's guide.

Designating the startup device

The priority number of the internal hard disk is always zero (0). To designate the internal hard disk as the startup device, see "Redesignating the Startup Device on Your Macintosh SE or Macintosh II," earlier in this chapter.

Overriding your startup device

If the System Folder on your internal hard disk is damaged, you might not be able to start up your system. In that case, you need to press a combination of four keys—Apple, Option, Shift, and Delete—to force your computer to look for another startup device. The internal hard disk cannot be switched off separately.

Connecting your Hard Disk SC

The rules for connecting your external Hard Disk SC change slightly if you have an internal SCSI hard disk, because the internal hard disk contains its own SCSI terminator. You still need to arrange your SCSI cables so there are no more than two terminators connected to your system. See "Connecting Your Hard Disk," Chapter 4 of this guide.

Reconnecting your hard disk

Each type of Macintosh exchanges information with your Hard Disk SC at a different rate. The Macintosh II is faster than the Macintosh SE. The Macintosh SE is faster than the Macintosh Plus. (Older versions of the Macintosh do not have SCSI ports.)

The type of Macintosh that you use to initialize your Hard Disk affects its speed and performance.

If you plan to reconnect your hard disk to another, faster Macintosh, you'll probably want to reinitialize the disk on the new machine to operate it more efficiently. Follow these steps:

1. **Back up all the files on your Hard Disk SC.**

   You can use HD Backup, described in Chapter 2.

2. **Switch off your system and disconnect your hard disk.**

Warning To avoid damaging the device you're working with, always switch off the Hard Disk SC and your computer before connecting or disconnecting hardware.

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3. **Connect your hard disk to the other Macintosh.**

4. **Start up your new system and reinitialize the hard disk.**

   Use Apple HD SC Setup, as described in your *Hard Disk 20SC Owner's Guide.*

   ❖ *Note:* In that guide, Apple HD SC Setup is called Hard Disk 20SC Installer, but it is the same program.

5. **Restore your files.**

   Use HD Backup again if you used it to back up your disk.

   If you plan to use your Hard Disk SC as a startup device, make sure that the system files you used with the original hard disk are designed to work with the Macintosh to which you have connected it. If not, replace them. See your Macintosh owner's guide to find out which versions of the System file and Finder your computer requires.

❖ *Note:* If you plan to reconnect your hard disk to more than one type of Macintosh, initialize it using the slowest one. That is, if you expect to move your Hard Disk SC back and forth among a Macintosh Plus, a Macintosh SE, and a Macintosh II, initialize it with the slowest type, which is the Macintosh Plus if you are using one and the Macintosh SE if you are not.

A troubleshooting note

You may, when opening Apple HD SC Setup, immediately see the message "Drive selection failed." After checking that your Hard Disk SC's are connected properly (see Chapter 4 of this guide) and switched on, see if you have two SCSI devices with the same priority number indicated on their priority switches. If so, reset one.

Chapter 2

HD Backup

[This is the same description of HD Backup that appears in the *Macintosh Utilities User's Guide,* so it has already been translated. Note that in the User's Tip in step 6 of Global Backup, the *Utilities User's Guide* incorrectlty identifies the upper disk drive as the higher priority drive.]

Approaches to backing up your hard disk

HD Backup is an application that lets you protect the contents of your hard disk by making backup copies of your files on 3.5-inch disks and, if necessary, by restoring those files onto the hard disk.

One of the hardest lessons any computer user learns is that it is important to make copies of files in case data or programs are damaged by malfunctioning hardware, faulty software, human error, external intervention (such as an exploring three-year old), or mysterious events beyond rational explanation.

When you are using only 3.5-inch disks, it is relatively quick and easy to copy files or even entire disks onto backup disks and recopy them should the need arise. When working with a hard disk with 20 megabytes or more of storage, however, reconstructing your entire disk may be difficult. If you share that disk with other users, putting your files back together again may be impossible without the aid of a backup utility such as HD Backup.

To protect the contents of your disk, you need to copy the entire contents of your hard disk onto several 3.5-inch disks. This is called a **global backup**. It is generally time consuming.

At the end of each work day or some other regular period, you need to back up your disk again. However, since you probably use only a fraction of your disk during any work session, you need only copy the documents that you've modified or created recently. This is called an **incremental backup**.

In each incremental backup, you copy onto 3.5-inch disks all files that you have created, modified, or copied onto your hard disk *since the last global backup*. Thus, each time you complete a incremental backup, you create a new stack of incremental backup disks. You can back up onto your old stack of incremental backup disks or set it aside for your next backup.

With each incremental backup you increase the amount of information stored on your incremental backup disks. When that stack roughly equals half your stack of global backup disks, you probably should do another global backup. Then you can start all over again with your incremental backups.

When working with an important document, you may also want to copy it onto a 3.5-inch disk whenever you save it. You can accomplish this easily with the Save As command, unless it is too large to fit on one of the disks. In that case, you need to use the "Back up a single file" option of HD Backup.

If you lose the entire contents of your hard disk, you can restore it by erasing the hard disk and then copying all the global backup disks back onto the hard disk. Then, you can bring it up to date by copying the incremental backup disks onto the hard disk.

If you lose a single file, you can restore it to the hard disk from one of your backup disks without copying the entire collection of backup disks.

Backing up files

Before you use HD Backup for the first time, it makes sense to copy it onto your hard disk. Keep the original or another copy handy, however, since you can't use the hard-disk copy to restore the contents of that disk if it is damaged.

Warning HD Backup does not copy certain files with filenames that begin with a period. To avoid problems, make sure that you rename all such files (so they don't begin with a period) before running HD Backup.

Be sure to collect enough 3.5-inch disks to complete both a global backup and successive incremental backups. It can take as many as twenty-five 800K (double-sided) disks to back up an entire 20-megabyte hard disk and about half as many—up to twelve or thirteen—for the largest incremental backup. You may even wish to use two different sets of global backup disks and two sets of incremental backup disks, alternating them in case your machine fails *during* a backup.

Warning HD Backup erases all information previously stored on your backup disks, so make sure that none of them contain documents or programs that you need.

Global backup

To carry out a Global backup:

1. **Open the HD Backup application by double-clicking its icon.**

   You can also select HD Backup and choose Open from the File menu.

   A dialog window appears, instructing you to select a function and a volume. **Volume** is a general term referring to a storage device. In HD Backup, it means your hard disk in nearly all situations, but it can apply to any Macintosh storage device except 3.5-inch disks.

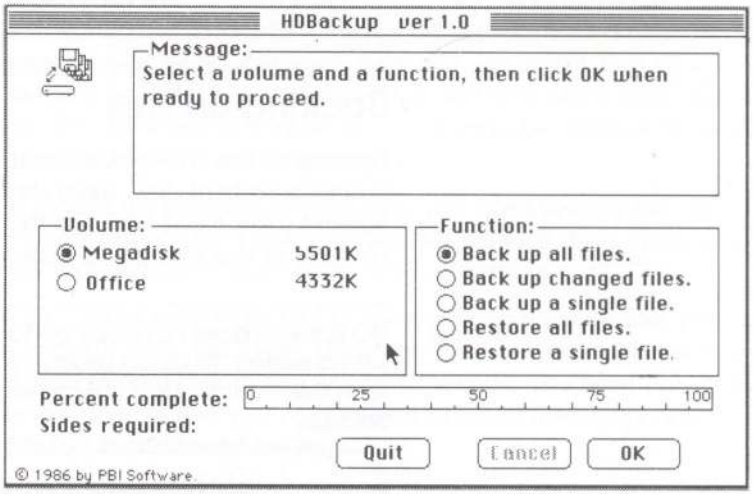

Figure 2-1
The HD Backup dialog

   To the right of each hard disk listed, HD Backup shows the amount of disk space in use, in kilobytes.

2. **Click the Volume button in the left column corresponding to the hard disk that you wish to copy.**

   If you have only one hard disk, it is automatically selected.

If you have more than five hard disks hooked up to your system, the disk you wish to back up may not be listed. In that case, return to the Finder and drag to the trash the icon representing one of the listed hard disks. Then switch off the disk drive. Continue until the disk you want appears in the HD Backup window. (Be sure you don't shut down your startup disk or the disk you are using to run HD Backup.)

3. **Select the "Back up all files" function in the right column, and click OK.**

   HD Backup automatically ejects any disk found in your 3.5-inch disk drives.

   In the lower left, HD Backup reports how many disk sides (400K each) are required to complete the backup.

4. **When instructed by the dialog, insert the first disk from your global backup stack into one of your 3.5-inch disk drives.**

   If the disk is unreadable, the program asks you to eject it or initialize it as one-sided or two sided. Click the appropriate button.

   You can reinitialize a disk that is readable by holding down the Option key as you insert the disk. While this is generally unnecessary, you may do it, for example, to reinitialize at 800K a double-sided disk that was initialized at 400K.

   HD Backup automatically names each disk with a number and the name of the hard disk being backed up. The first backup disk for a volume named Megadisk is always 1.Megadisk, followed by 2.Megadisk, and so on.

   HD Backup always reports when it's waiting, initializing a disk, verifying a disk, or backing up files. It displays the name of each file as it is copied.

   As each disk is filled, HD Backup ejects it and requests the next one. A black line moves across the "Percent complete" bar at the bottom of the window, indicating the percentage of the global backup that is completed. In addition, HD Backup subtracts one or two from the "Sides required" display, depending upon the size of the disk just ejected.

Click Cancel to halt the backup at any point. If you cancel, you cannot restore files from the backup disks that you have already created. You can either click Quit to exit from HD Backup or proceed again by selecting the volume and function and clicking OK.

5. **Label the disk with its assigned name as well as the date.**
6. **Insert the next disk.**

   If you insert any of the disks that you have just copied files onto, HD Backup ejects it and requests another.

❖ *User's Tip:* If you have more than one 3.5-inch disk drive, you can save yourself a little work by inserting disks into all drives at once. HD Backup copies onto the disks in the order of their priority. (If you have internal and external 3.5-inch drives, the internal drive always has the higher priority. If you have two internal drives, the lower drive has the higher priority.)

Label each disk and insert another one, as requested by the dialog.

7. **When HD Backup reports that the backup is complete, click OK and then click Quit to exit from the program.**
8. **Label your backup stack and store it in a safe but accessible place.**

Incremental backup

The procedure for an incremental backup is similar to the global backup sequence described above:

1. **Open HD Backup.**
2. **Select the correct volume.**
3. **Select the "Back up changed files" function and click OK.**

   Any document or file that has been created, modified, or moved to the hard disk since the last global backup is copied.

   Some applications, such as MacWrite™, actually change when they are opened, so files may unexpectedly end up on your incremental backup.

Important Any document which has an incorrect Date Created or Date Modified, recorded as a future date, is copied everytime you run "Back up changed files." Incorrect dates are recorded whenever you create or modify a document while the Macintosh clock is set on the wrong date. From the Finder, you can select a document and choose Get Info from the File menu to check the dates. If the problem is only with the Date Modified, you can reset it by saving a minor modification to the document.

When you select "Back up changed files," HD Backup does not display "Sides required," but the "Percent complete" bar shows the percentage of a full backup that you've completed.

4. **When HD Backup is ready, insert the first disk from your incremental backup stack into a 3.5-inch disk drive.**

   If you have more than one 3.5-inch disk drive, you can insert more than one disk at a time.

   HD Backup names each disk by adding a number *after* the name of the hard disk. That is, the first incremental backup disk for a volume called Megadisk is Megadisk.1; the second is Megadisk.2; and so on.

   If you click Cancel, you cannot restore files from the backup disks that you have already created.

5. **As each disk is ejected, label its assigned name as well as the date, and insert the next disk.**

   Repeat as often as necessary.

6. **When HD Backup reports that the backup is complete, click OK and then click Quit to exit from the program.**

   When the "Percent complete" bar shows more than fifty percent at the completion of an incremental backup, it's time to do another global backup.

7. **Label your backup stack and store it in a safe but accessible place.**

Copying large files

By specifying the "Back up a single file" function of HD Backup, you can copy a file too large to be copied with the Finder:

1. **Open HD Backup.**
2. **Select the volume containing the file you wish to copy.**
3. **Select the "Back up a single file" function and click OK.**

   A dialog, similar to ones that appear when saving or opening documents from an application, appears.

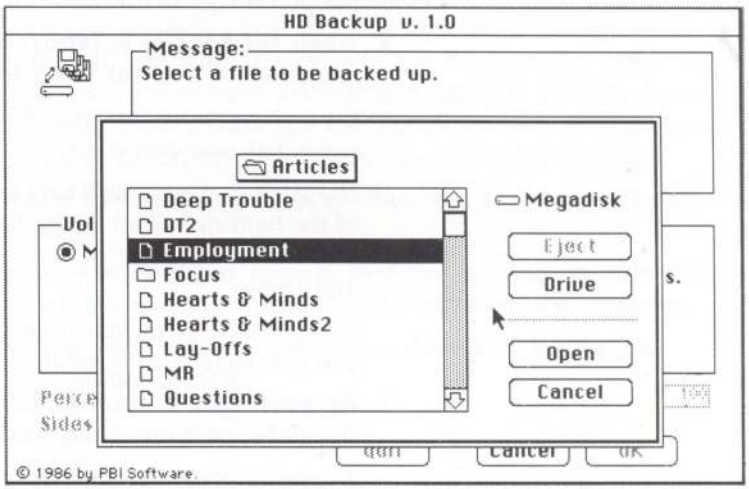

Figure 2-2
Backing up a single file

You can move up your hierarchy of folders by pressing on the directory name and choosing the folder or disk directory you want. You can scroll other files and folders into view if the scroll bar is activated. And you can select and open folders shown in the directory.

Once the file you wish to copy is in view, select it and click Open (or double-click the filename). HD Backup asks you to insert a disk.

4. **Insert the first backup disk or, if you have more than one 3.5-inch disk drive, insert disks into each.**

Neither "Sides required" nor the "Percent complete" bar operates with the "Back up a single file" function.

HD Backup names each disk as if it were doing a global backup, placing a number before the hard disk name.

If you click Cancel, you cannot restore files from your backup disks.

5. **As each disk is ejected, label its assigned name as well as the date, and insert the next disk.**

   Repeat as often as necessary.

6. **When HD Backup reports that the backup is complete, click OK and then click Quit to exit from the program.**

   Since the "Back up a single file" feature uses the same naming procedure as "Back up all files," you should label these disks to distinguish them from those in your global backup stack.

7. **Store you backup disks in a safe but accessible place.**

Restoring files

Use HD Backup to copy your files from your backup disks to any hard disk. Files and filenames on backup disks differ from disks created using the finder, so you can introduce errors by using the Finder to restore your files. (See the section "When Your Restoration Fails" later on for instructions on using the Finder when you are unable to use HD Backup to reconstruct the contents of your hard disk.)

HD Backup shows icons for all copied files, even if the directory from which they were copied is arranged by another view (using the View menu in the Finder).

During Backup, HD Backup changes filenames that appear more than once on your hard disk (in separate folders). For example, two files named Dear John become Dear John.1 and Dear John.2.

HD Backup packs your files into every available sector of disk space, so some files are split into two pieces (or more, in the case of very large files) and renamed. For example, if your file called Poem is being copied onto a disk when the disk becomes full, that piece is renamed 1.Poem. The first file on the next disk is 2.Poem. (The split files also have distinctive icons so you can tell they're incomplete.)

Restoring a single file

Use HD Backup to restore a single file from your backup disks to your hard disk without erasing or reorganizing the hard disk.

1. **Open HD Backup.**
2. **If you have more than one hard disk connected, select the correct volume.**
3. **Select "Restore a single file" and click OK.**

   HD Backup ejects any 3.5-inch disks in your machine and asks for a backup disk.
4. **Insert one of your backup disks.**

   You can restore files from any disk created with HD Backup's three backup functions.

   HD Backup presents a dialog containing a file directory for your backup disk, as well as buttons for ejecting disks, switching drives, opening a file, or canceling the restore command. Every file and piece of a file on that disk is shown, in numerical and alphabetical order. Folders, however, are not displayed.

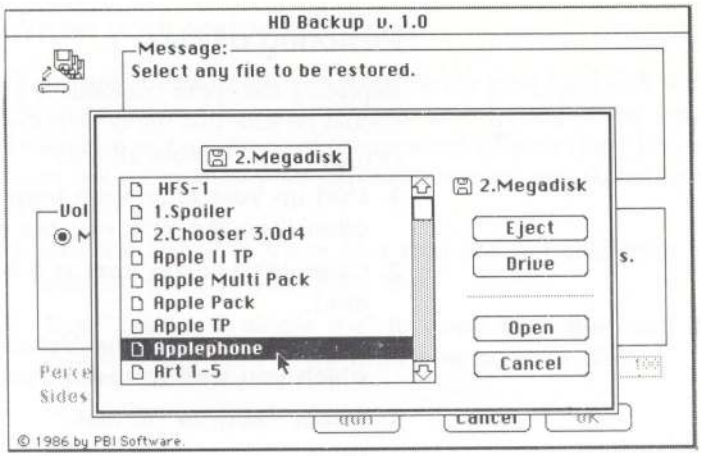

Figure 2-3
Restoring a single file

Look in the file directory, scrolling if necessary, for the file that you wish to restore.

If the file you are searching for is not on the disk, click the Eject or Drive button and insert another disk. Repeat the search until you locate the file.

If, in the course of locating a file, you notice the placement of other files that you think you may wish to restore later, note them on the disk label.

5. **Select and open the file you wish to copy.**

   You can also double-click the filename in the directory.

   If during backup HD Backup split the file into two or more pieces, find, select, and open the first piece. (Remember, the first piece of a file called Poem is named 1.Poem.)

   When the first piece is copied, HD Backup asks for the disk containing the second piece. As soon as you insert that disk, HD Backup automatically continues the restoration.

   If your file is large enough to be spread onto three or more disks, repeat as often as necessary.

6. **When the restoration is completed, click OK and then cllick Quit to return to the Finder.**

   If you wish to restore another file or to back up files, click a function button instead of Quit.

7. **Use the Finder to move the file to the proper folder.**

   HD Backup automatically restores any single file to the hard disk window.

Restoring all files

Replacing the entire contents of a hard disk takes time, so you should be sure that the contents of your disk are seriously damaged before using "Restore all files."

1. **Start up your Macintosh from a 3.5-inch disk (or a hard disk other than the one you are reconstructing).**
2. **Open HD Backup from a 3.5-inch disk (or another hard disk).**
3. **If necessary, click the Volume button for the hard disk onto which you wish to restore your files.**
4. **Select "Restore all files."**

   HD Backup warns you that it erases the selected hard disk.
5. **Click OK if you wish to continue.**

   If you don't want to erase the disk, click Cancel instead.

   The dialog requests you to insert your disks, naming them in order.
6. **Insert your global backup disks.**

   HD Backup ejects disks inserted in the wrong order or not belonging to the right set of backup disks.

   If you have more than one 3.5-inch drive, you can insert disks into each one.
7. **When all the global backup disks have been copied, insert your incremental backup disks, in order, one or two at a time.**

   HD Backup replaces files—from the global back up—with any modified versions of the same files.

   If you have no incremental backup disks, simply click both Cancel and Quit.
8. **When HD Backup reports that the restoration is complete, click OK and then click Quit.**

When your restoration fails

If you are unable to restore all the files to your hard disk with "Restore all files," but you still have your backup disks, you may still be able to salvage much of the contents of your disk. This procedure does not reconstruct your folders, however, and *it should only be used if all else fails.*

1. **Use the Finder to copy files that are not split from your backup disks to your hard disk.**
2. **Use "Restore a single file" to copy onto the hard disk files that are split onto more than one backup disk.**

Chapter 3

Your Hard Disk and Your Apple II

There are presently three devices in the Hard Disk SC series: the Hard Disk 20SC, the Hard Disk 40SC, and the Hard Disk 80SC. These three devices provide 20, 40, and 80 megabytes of storage, respectively. (20 megabytes is roughly equivalent to ten thousand pages of information.) Except for their labels, the devices are virtually identical on the outside.

The Hard Disk 40SC and Hard Disk 80 SC not only store more information than the Hard Disk 20SC, but they exchange information with your computer at a much faster rate. (See the Appendix, "Specifications.")

As this update goes to press, however, there is no Apple-supplied software that allows you to use your Apple II to store more than 32 megabytes of information on any hard disk.

Important If you have a Hard Disk 40SC or Hard Disk 80SC, be sure that your software is capable of initializing more than 32 megabytes of disk memory.

Chapter 4

Connecting Your Hard Disk

This chapter updates the *Apple SCSI Cable System* manual, which tells you how to connect your hard disk and other SCSI devices to an Apple II or Macintosh Computer. If this *Update* conflicts with either the *Apple SCSI Cable System* manual or the *Hard Disk 20SC Owner's Guide,* follow the procedures laid out in the *Update.*

Placing the terminators

Since the publication of the *Apple SCSI Cable System* manual, engineers have identified four situations in which there is a need to update the placement of your SCSI cable terminators. One fundamental rule remains, however:

- **Never connect more that two cable terminators to your system.**

When you use a cable extender

Any time you use more than 3 feet of cable, you need a second terminator. Thus, when you connect one SCSI device to your Macintosh with a system cable and cable extender, one terminator goes between the two cables and the other goes between the extender and the SCSI device.

When you have an internal SCSI hard disk

Since the Apple-labeled internal SCSI hard disk has a built-in terminator, your chain of external SCSI devices can contain only one terminator.

- **If you are connecting a single external SCSI device, place the terminator between the system cable (or cable extender) and the device.**
- **If you are connecting more than one external SCSI device, add a terminator between the last cable and the last device.**

Important If you plan to use a SCSI internal hard disk from another manufacturer, make sure it has a built-in terminator.

When you have a non-Apple external SCSI device

- **If your non-Apple device has no built-in terminator, treat it exactly like an Apple device when making connections.**
- **If your non-Apple device has a built-in terminator, place it at the end of your SCSI chain.**

  Don't add a terminator at that point.

Important If more than one device has a built-in terminator, remove the extra terminators or have your Apple dealer remove them.

Connecting the terminator to your Hard Disk SC

Your terminator works best if it is attached between the cable and your hard disk, as shown in Figure 4-1.

Important Do not attach the terminator to the hard disk's open SCSI port.

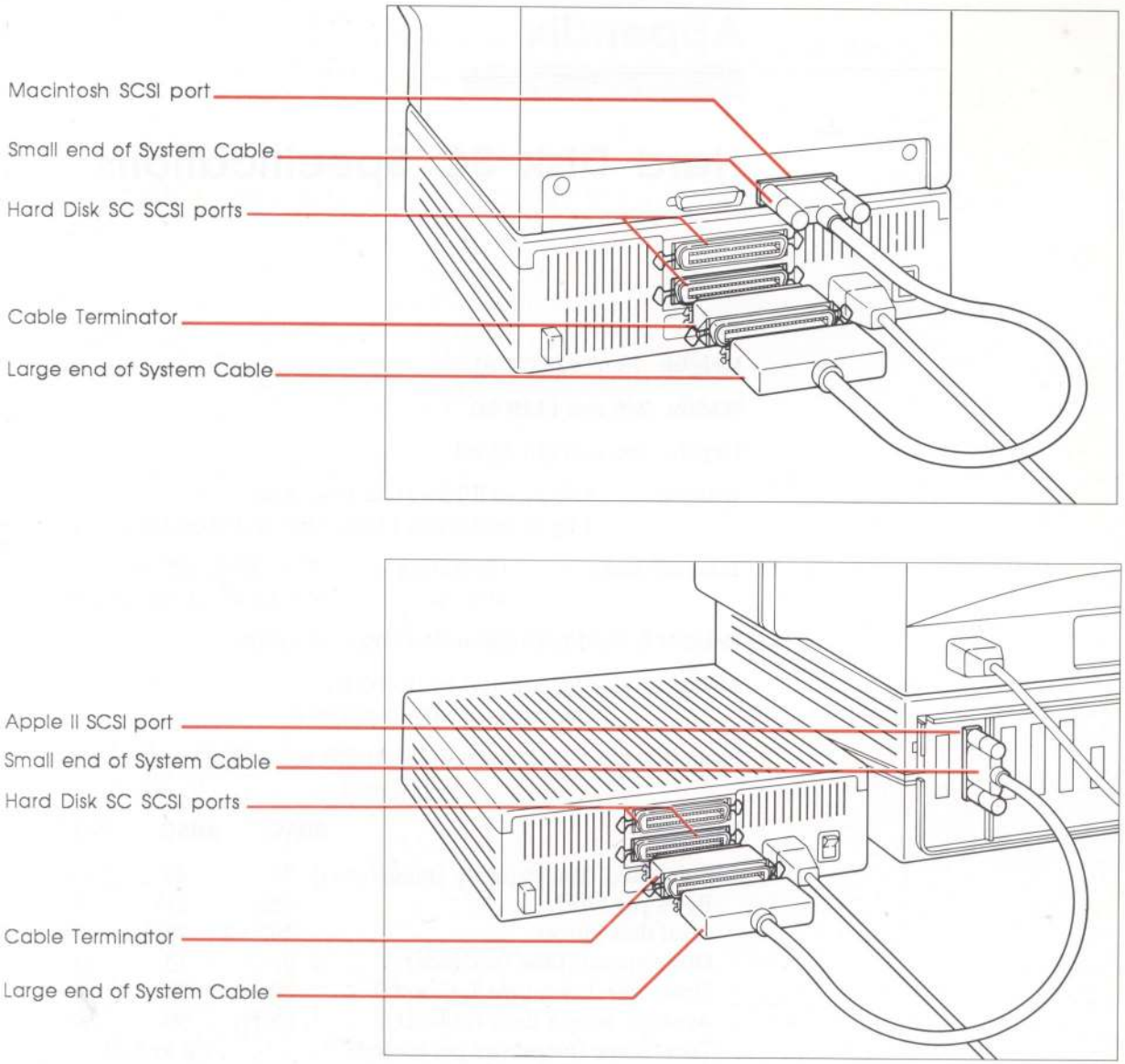
Macintosh SCSI port
Small end of System Cable
Hard Disk SC SCSI ports
Cable Terminator
Large end of System Cable
Apple II SCSI port
Small end of System Cable
Hard Disk SC SCSI ports
Cable Terminator
Large end of System Cable

Figure 4-1
Connecting a Hard Disk SC to a Macintosh or an Apple II

Appendix

Hard Disk SC Specifications

Height: 78 mm (3.07 in)

Width: 246 mm (9.69 in)

Depth: 266 mm (10.47 in)

Weight: 3.63 kg (8 lb) for Hard Disk 20SC
4 kg (9 lb) for Hard Disk 40SC and Hard Disk 80SC

Temperature:

Operating	10° to 40° C (50° to 104° F)
Storage	–40° to 50° C(–40° to 122° F)

Relative humidity (noncondensing): 20 to 80%

Altitude:

Operating	0 to 10,000 ft
Shipping	–1000 to 40,000 ft

Input power:

Line voltage	85 to 270 volts AC, 47 to 64 Hz
Power	60 watts

Storage:

	20SC	40SC	80SC
Formatted data capacity (megabytes)	20	40	80
Bytes per block	532	512	512
Total disk blocks	39,360	78,246	156,370
Drive startup time (seconds)	9	13	13
Drive spindown time (seconds)	20	18	18
Average access time (millisec.)	65/89	30	30
Transfer rate (megabytes per second)		up to 1.25	

Interface: Two 50-pin SCSI ports

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